Headquarters U.S. Air Force

Integrity - Service - Excellence

USAF Aviation Safety: FY 2003 In Review

Kurt D. McCartney, MD, MPH
Lieutenant Colonel, USAF, MC, CFS
Safety Center Surgeon

Maj Rob Vaccarella, USAFR
Safety Center, Life Sciences

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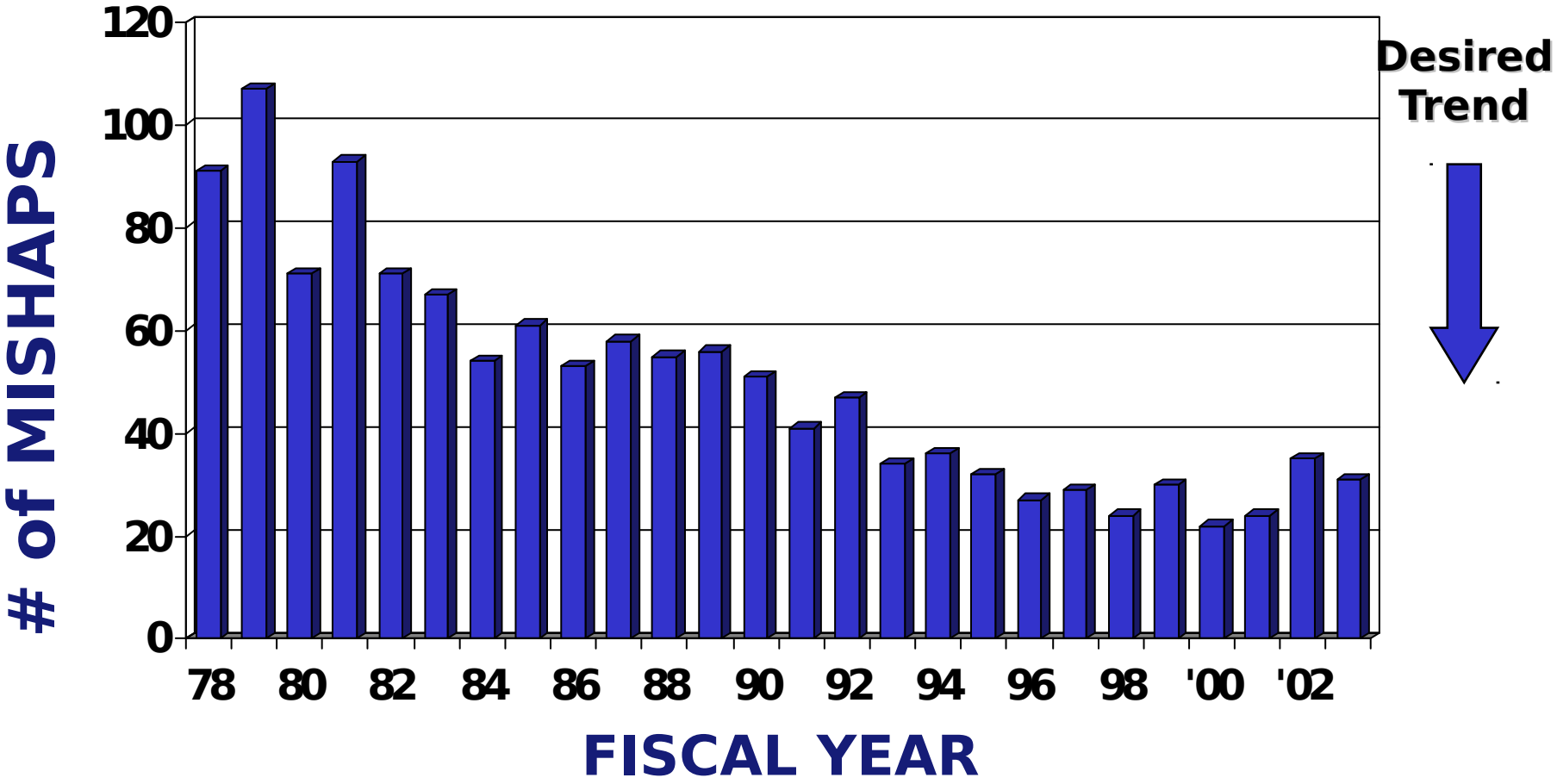
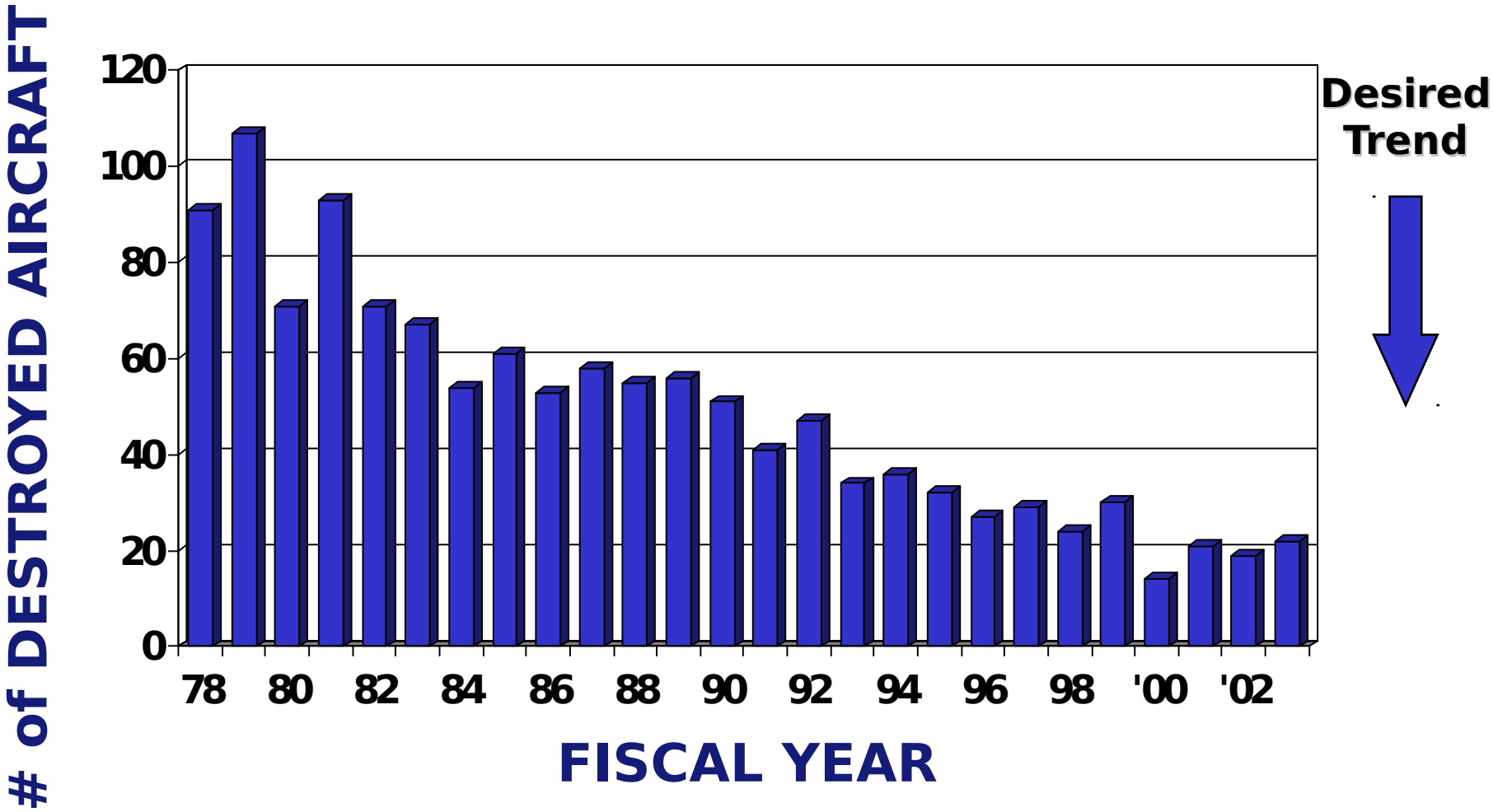
CLASS A FLIGHT MISHAPS

Rate Producing FY 78 - FY 03



DESTROYED AIRCRAFT
Rate Producing FY 78 - FY 03



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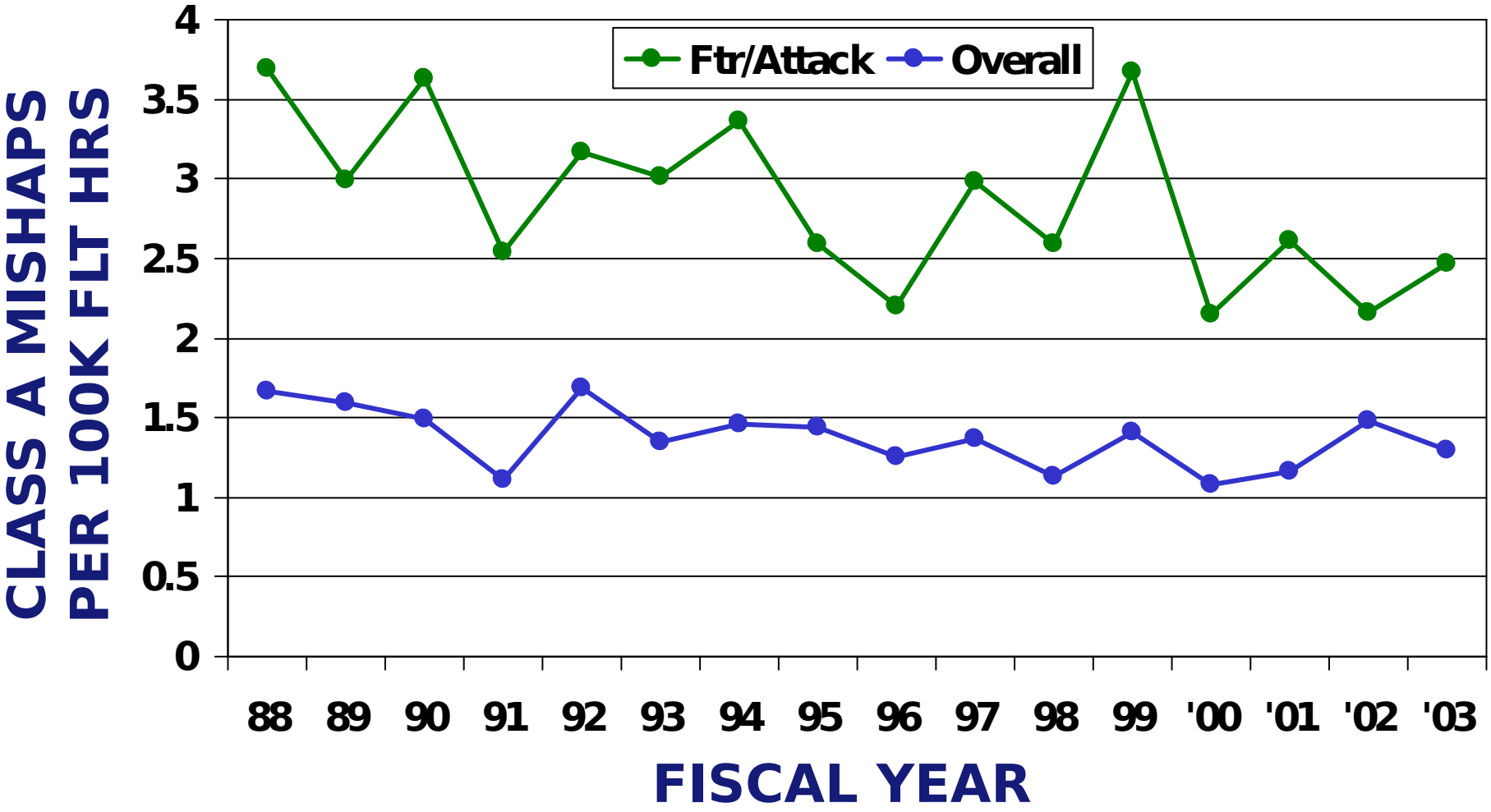
CLASS A MISHAP RATES

Rate Producing



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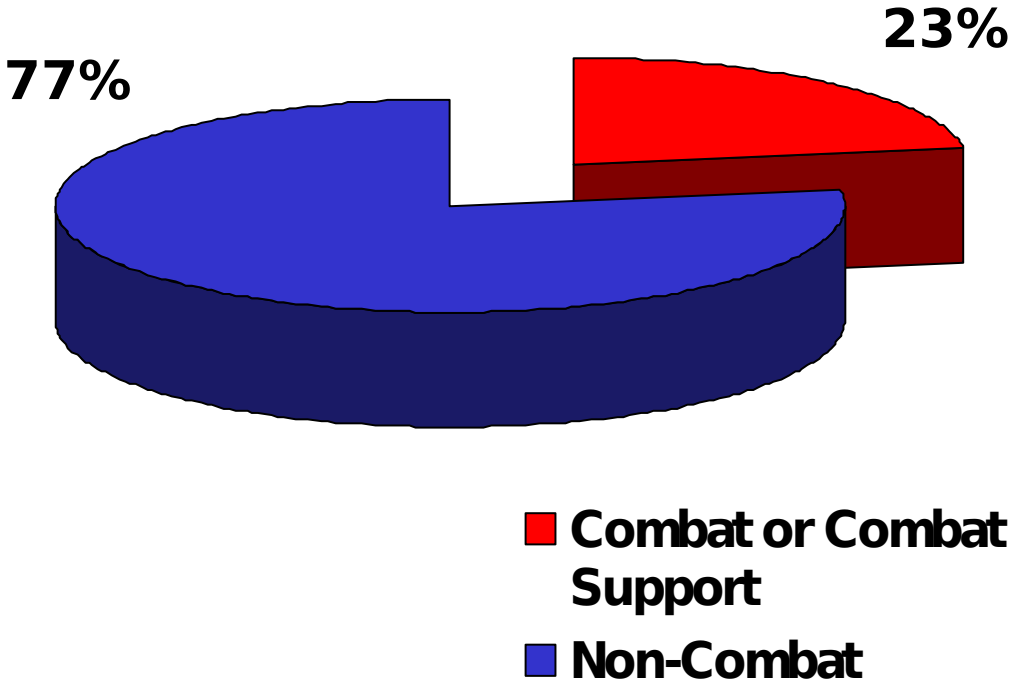
Combat Influence



7 of 31 mishaps were on combat/combat support missions.
2 occurred during Operation Enduring Freedom.
5 occurred during Operation Iraqi Freedom.

These are not combat losses.
These are *mishaps* occurring on combat or combat support missions.

RATE PRODUCING CLASS A MISHAPS: Human Factors "Major" or "Causal"

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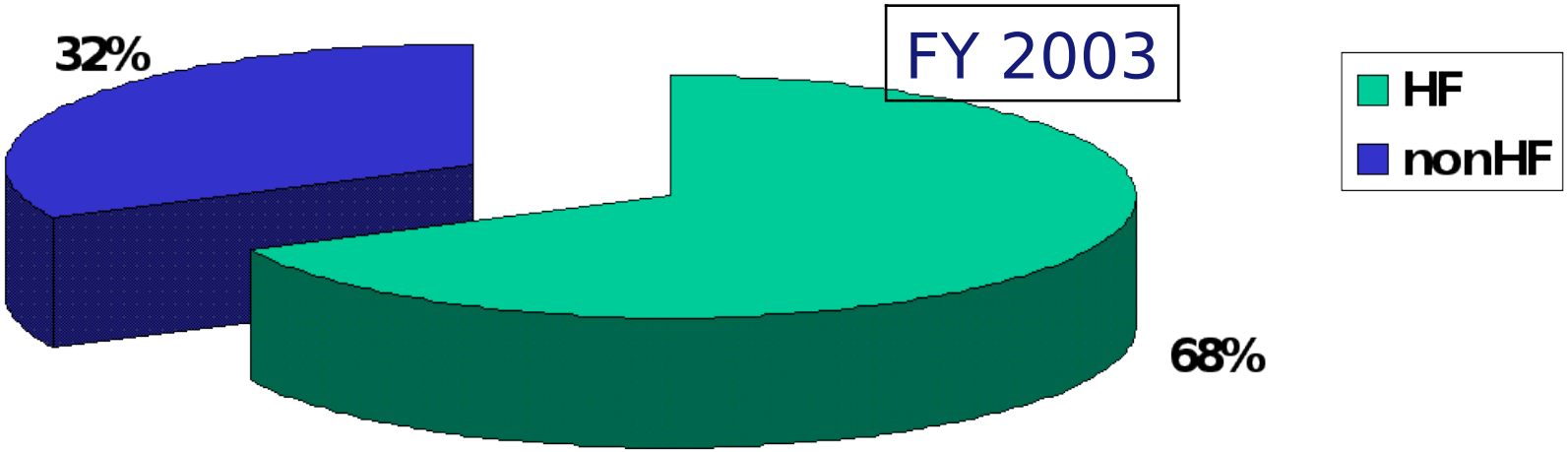
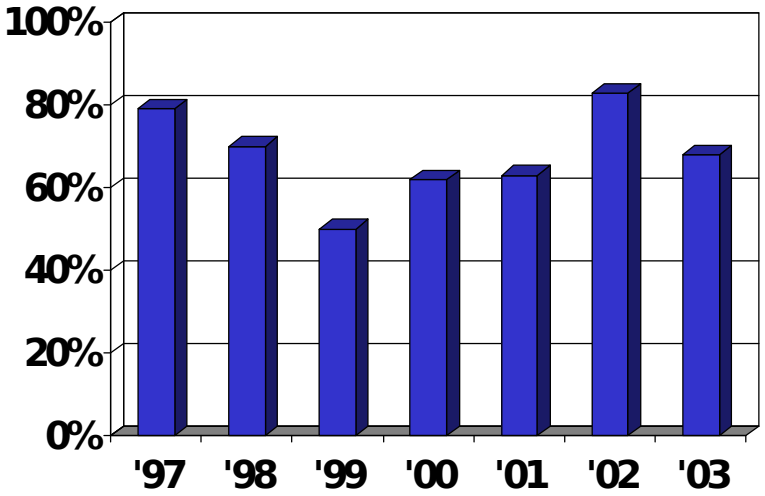


% Mishaps With Major or Causal HF



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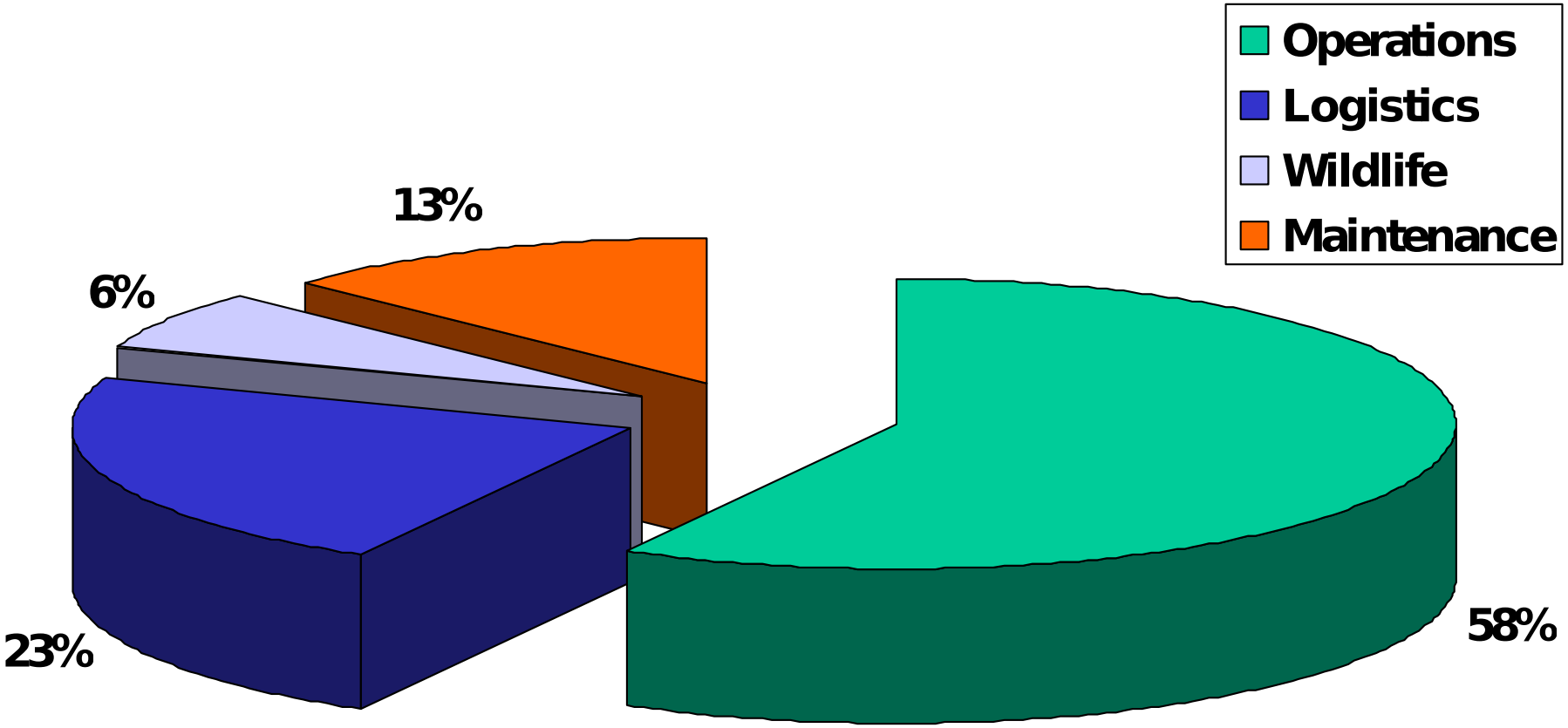
FY 03 Class A Mishaps

Rate Producing



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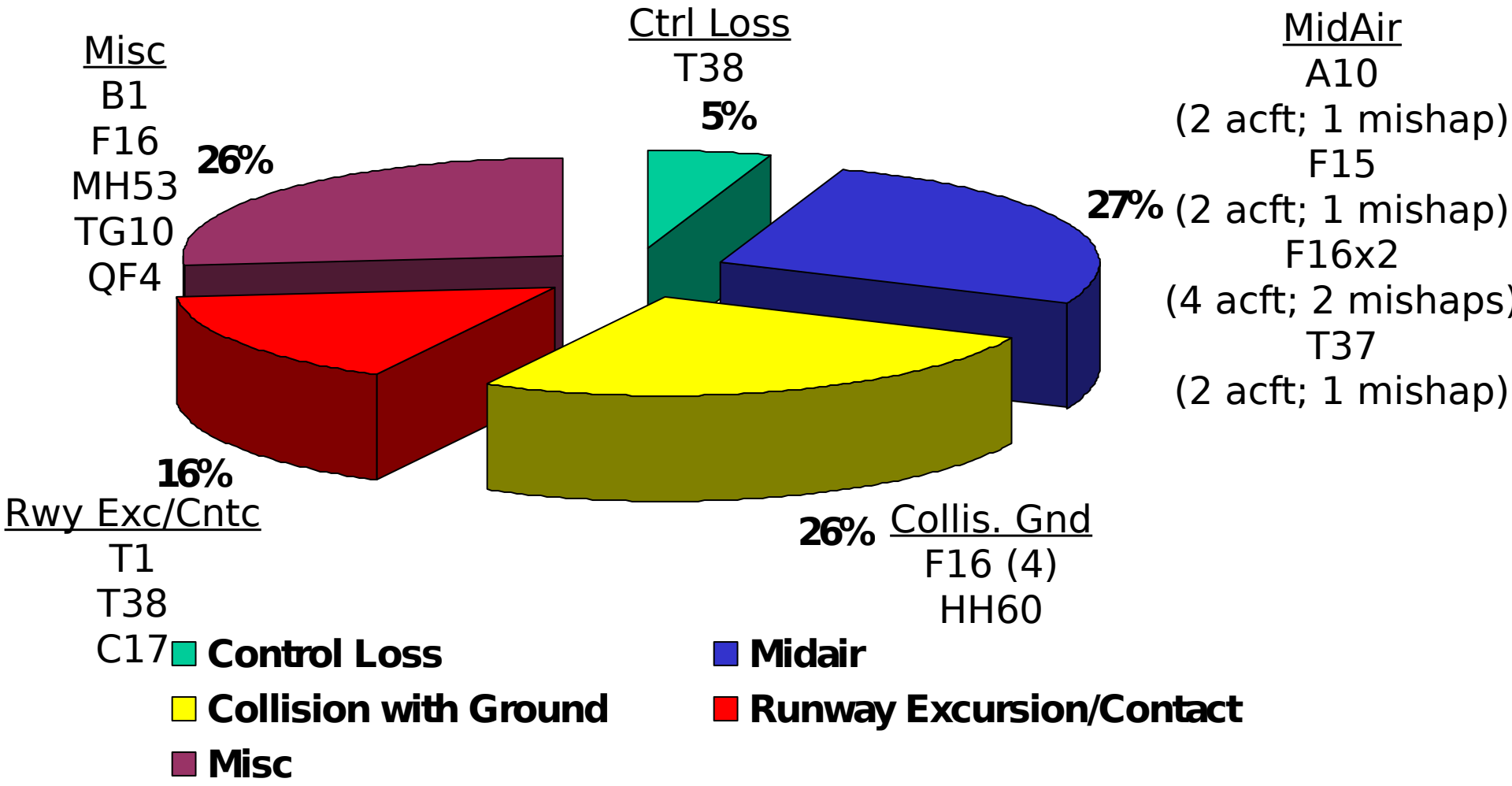
Ops Categories
Rate Producing



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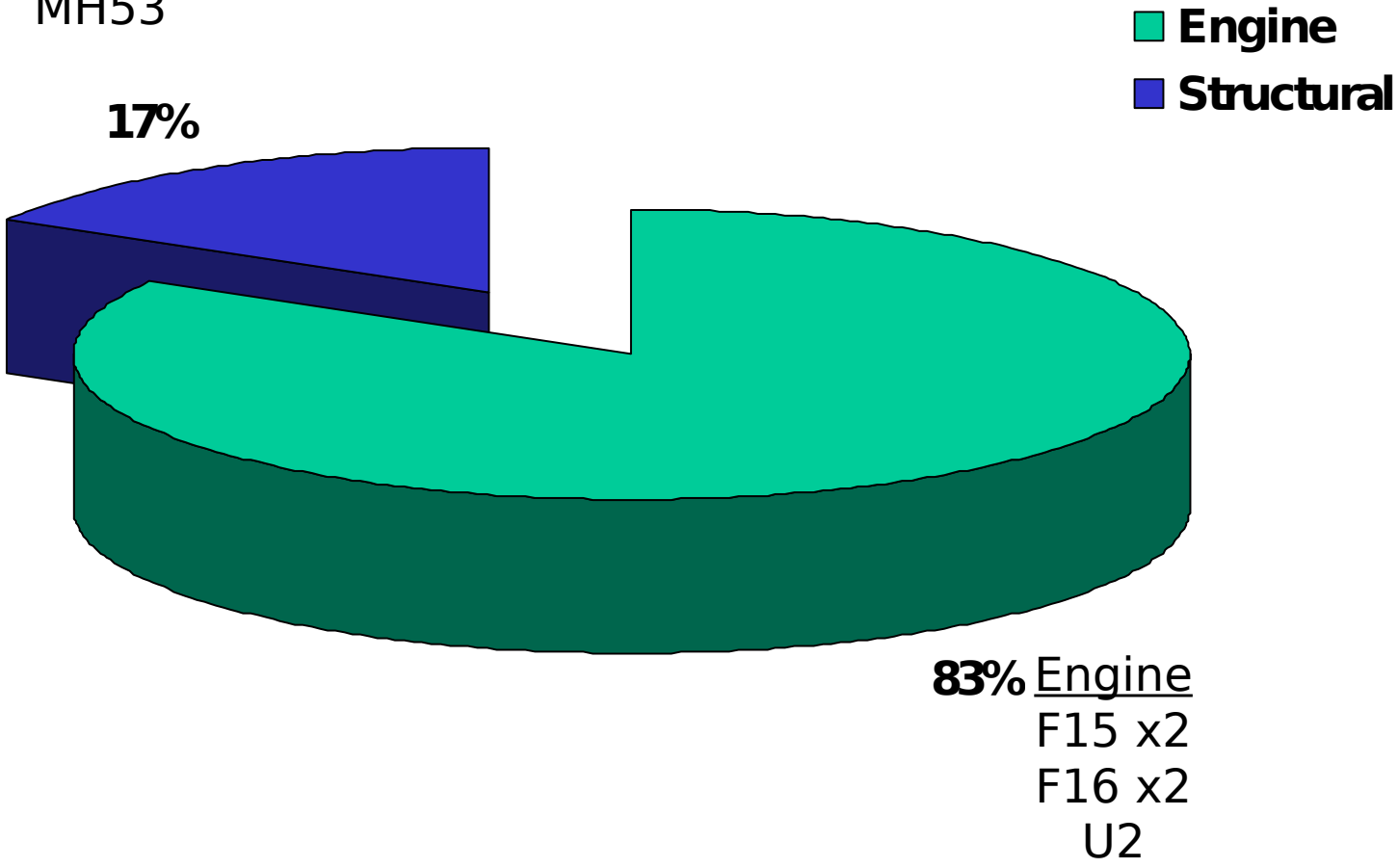
Logistics Causes
Rate Producing

Structural
MH53



Engine
F15 x2
F16 x2
U2

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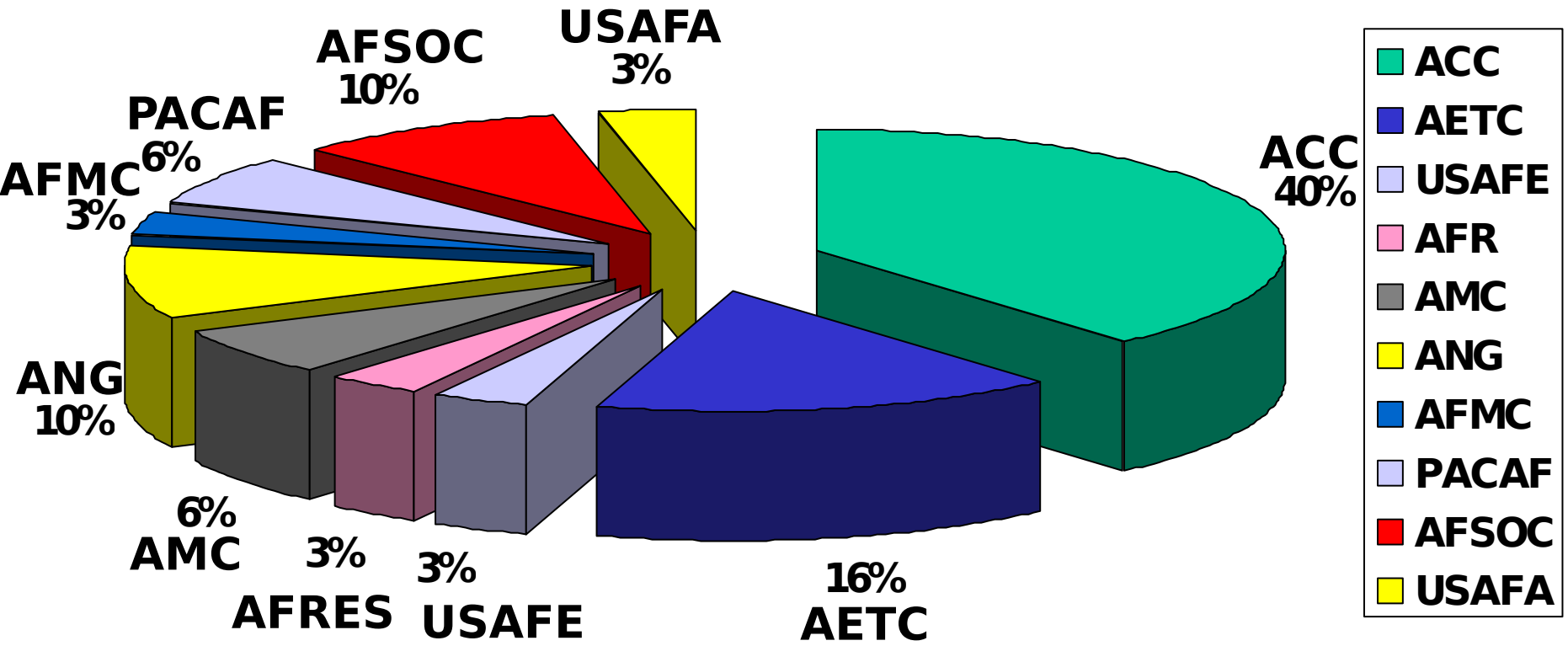
Class A Mishaps by MAJCOM

Rate Producing



Class A Mishap Rates by MAJCOM
Rate Producing

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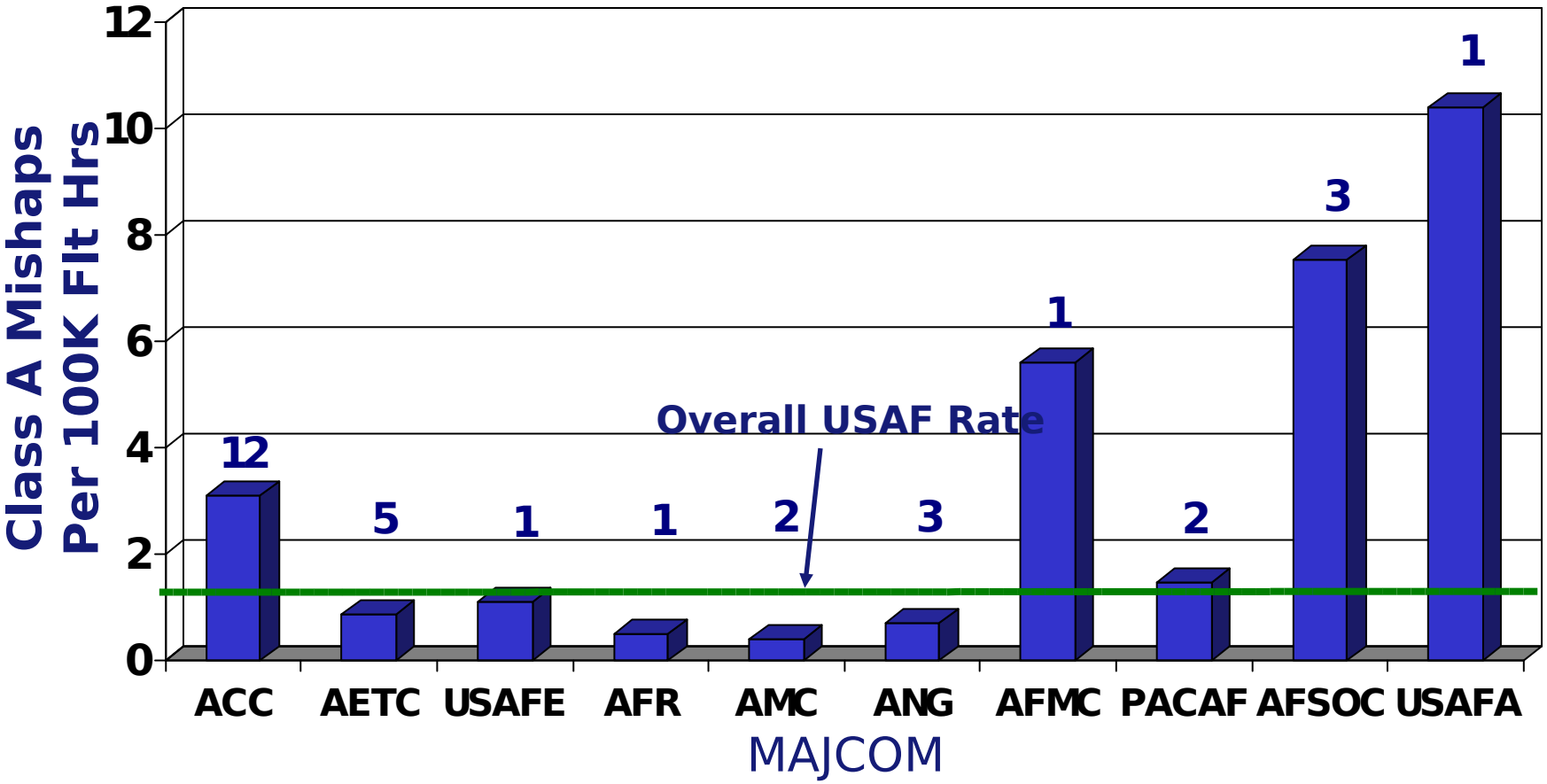

Actual number of mishaps shown in blue

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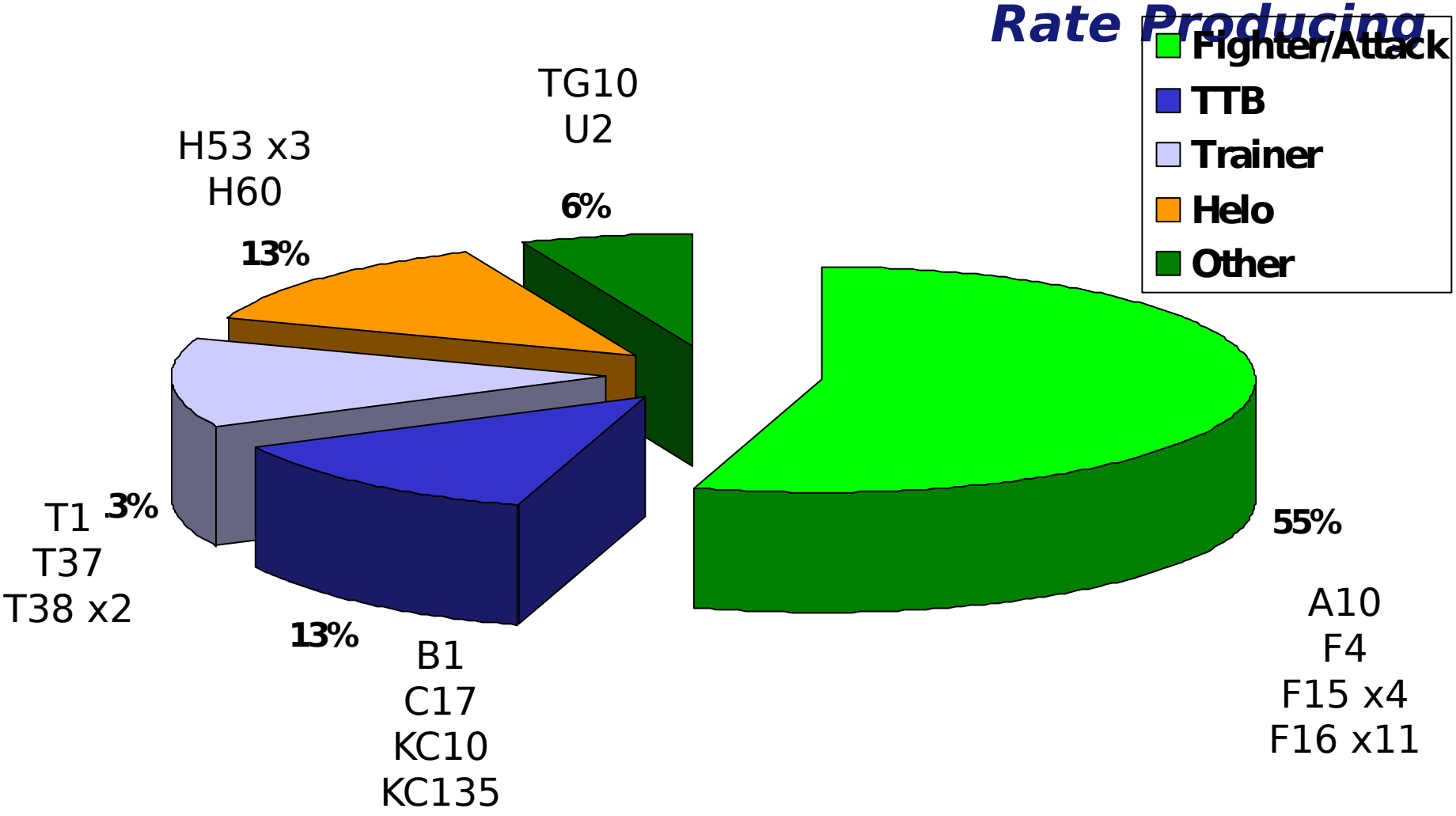
Class A Mishaps by Aircraft

Rate Producing



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FY 03 Helicopter Summary

- **4 Helicopter Class A Mishap**
  - **3 Night-related**
  - **6 of 10 aviation fatalities this year: HH-60 night refueling CFIT in AOR**
- **55% *Decrease* in # of Mishaps Compared to FY02 (9)**

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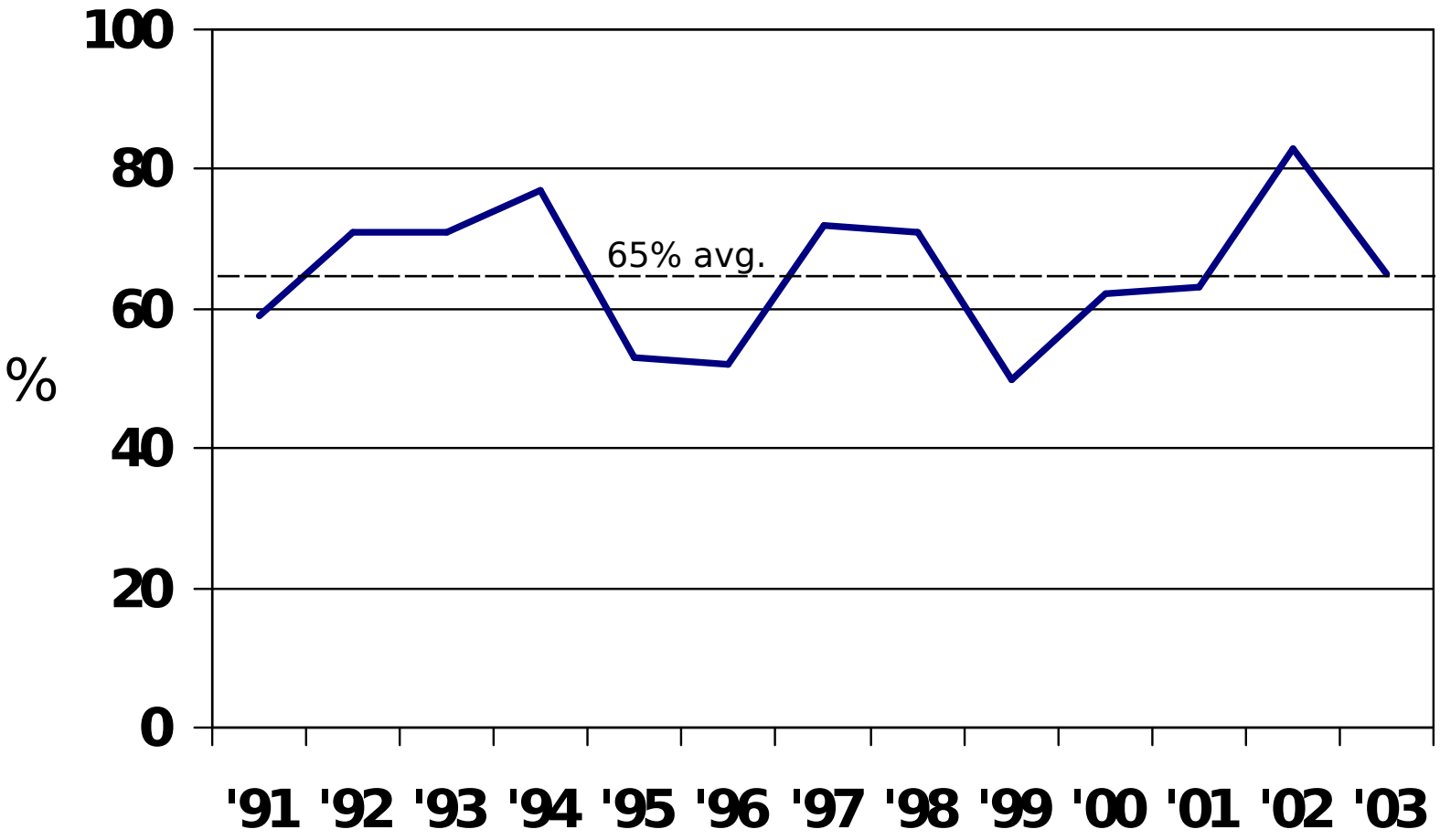
Human Factors in Context

of Class A Rate Producing Flight Mishaps Because of Human Facto



HF as % of Fatal Mishaps

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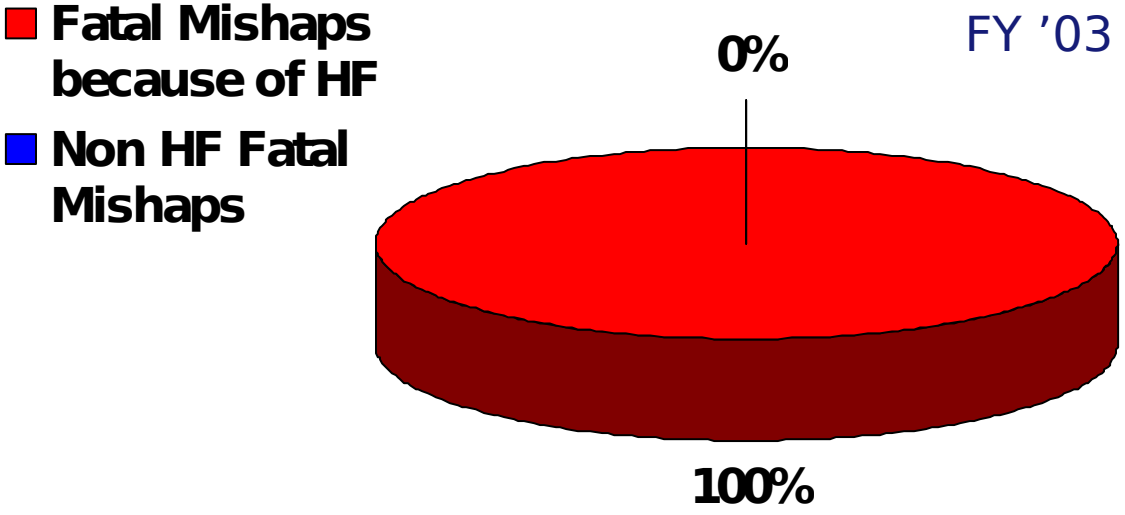
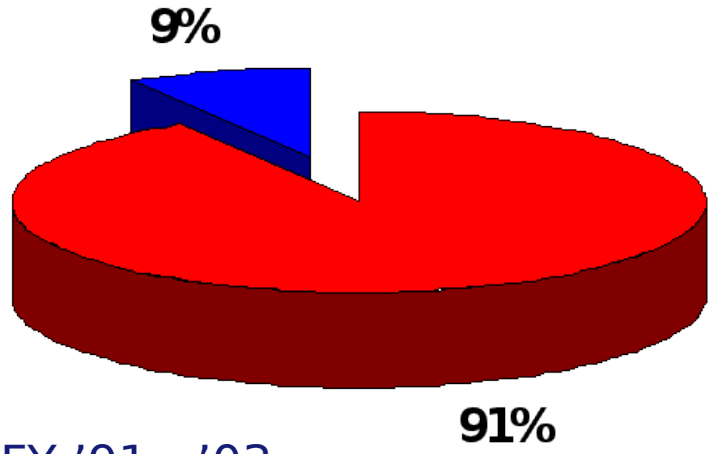
5/5 Fatal Mishaps
(10/10 Fatalities)
because of HF





FY '91 - '03

Over 90% of fatal aviation mishaps in the past 13 years because of Human Facto
[105 out of 114 fatal mishaps]

HF Mishaps
Other

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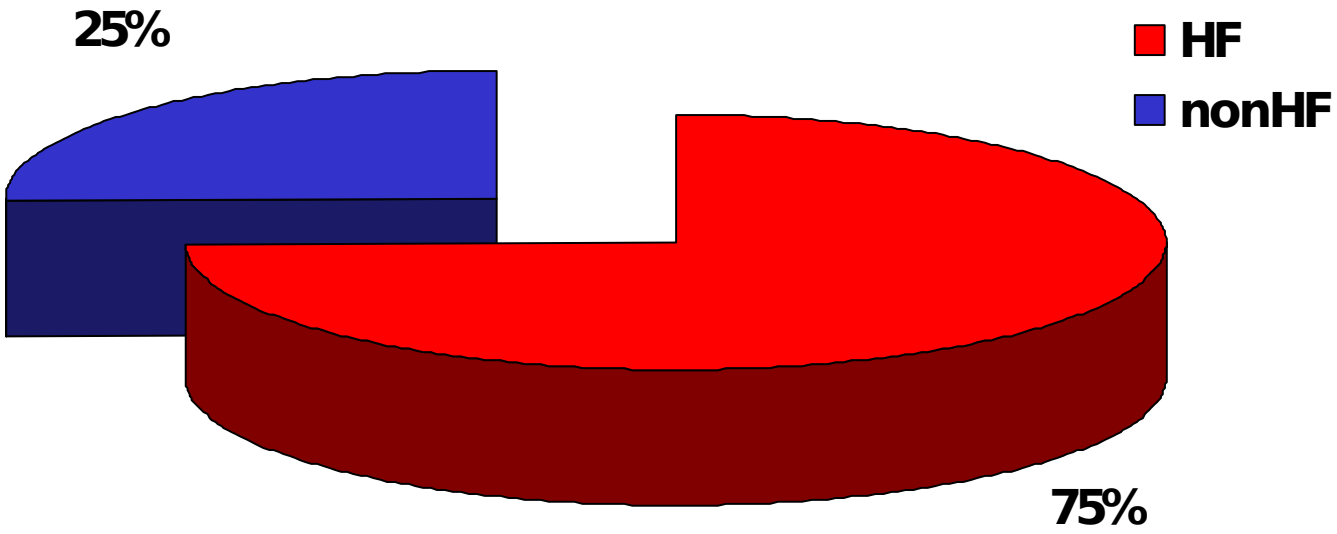
Cost of HF Mishaps
(Rate Producing)



Cost of HF Mishaps – FY 03: **$363,024,959.0**

Total Cost of FY 03 Rate Producing Class A Mishaps: $485,621,080.00

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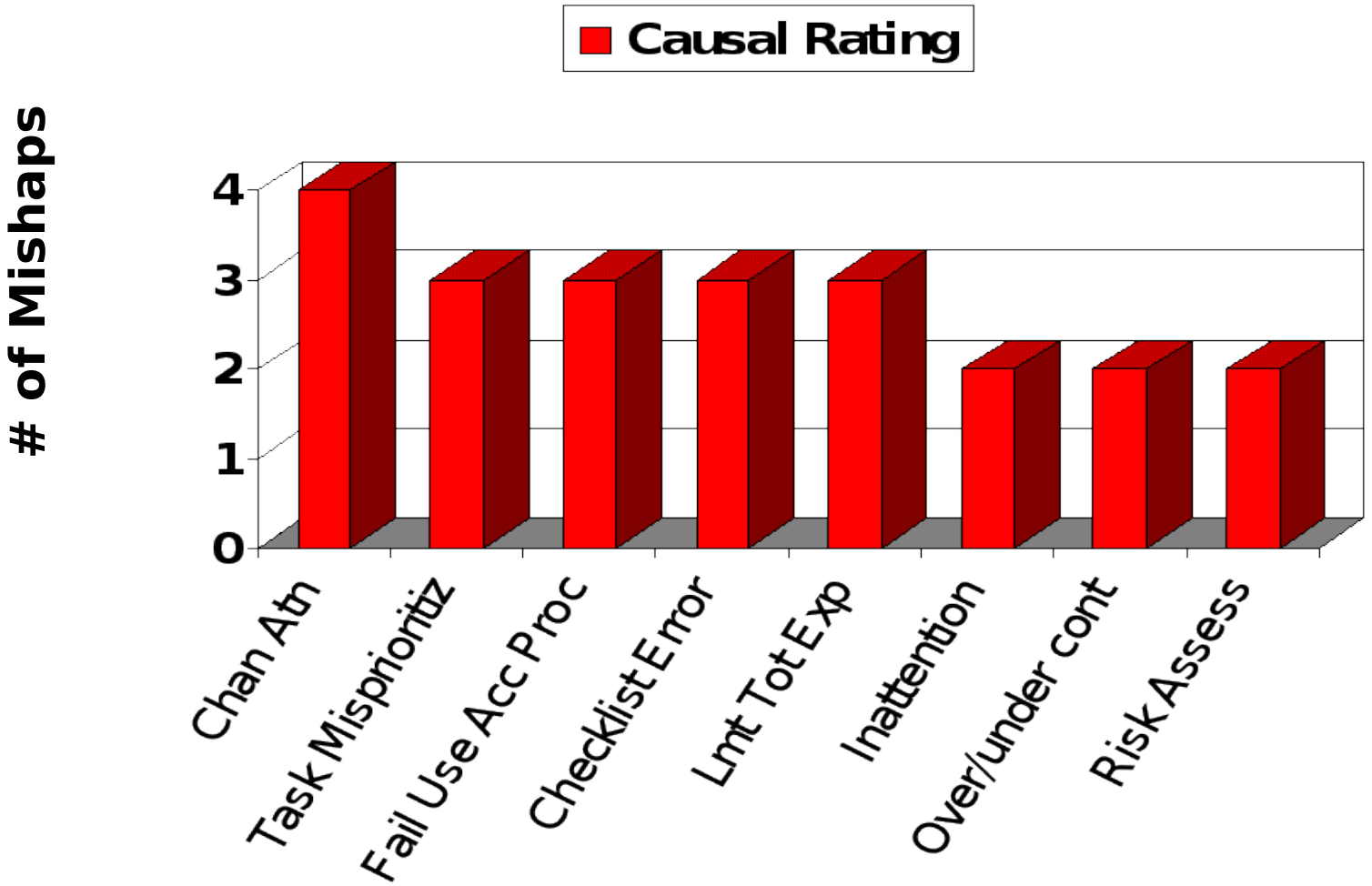
Most Common Specific Individual Factors



Human Factors Analysis and Classification System (HFACS)

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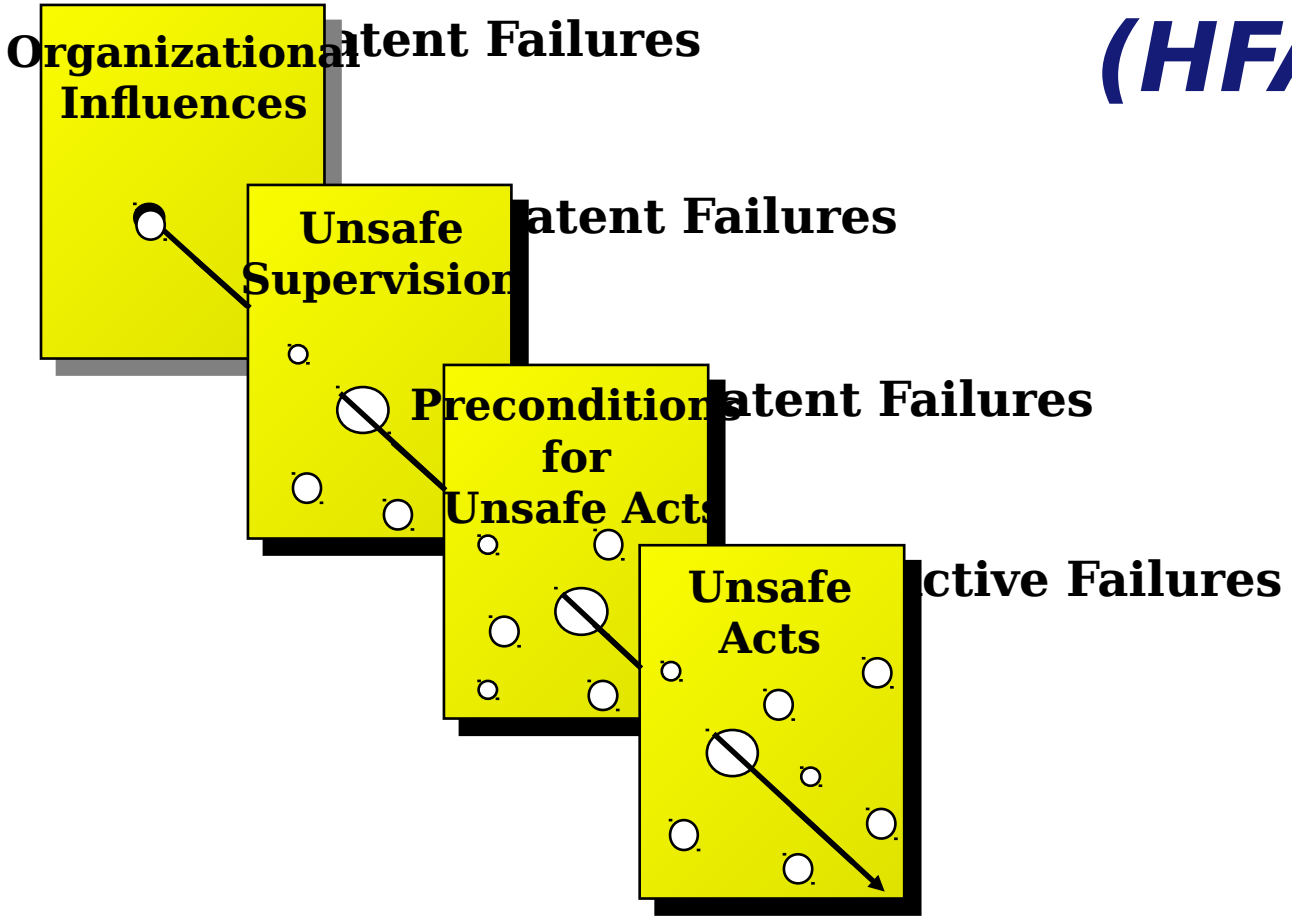

Adapted from Reason (1990)

Accident & Injury

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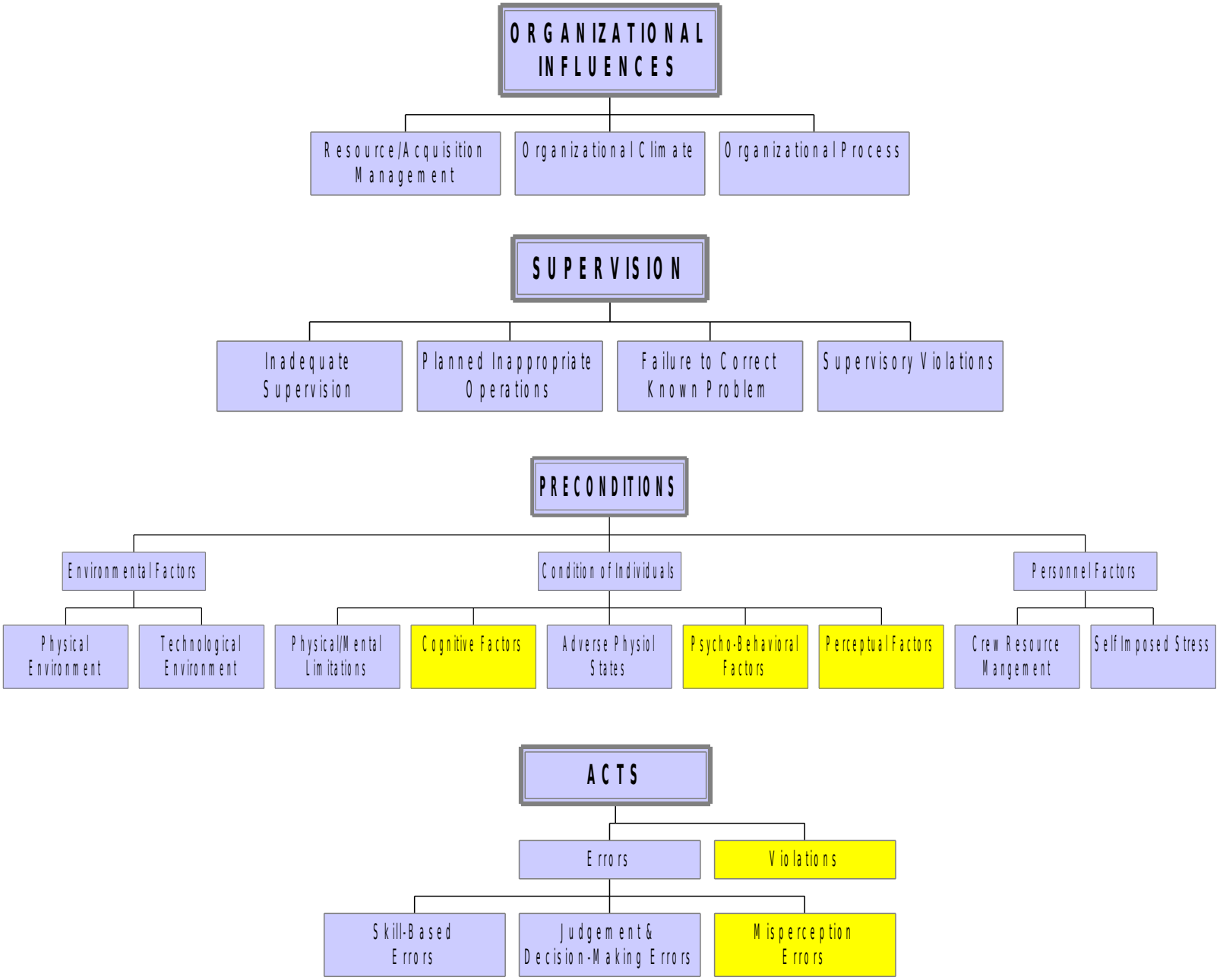
AF HFACS: A Work in Progress

- Based on Human Factors Analysis and Classification System (HFACS) by Doug Weigmann & Scott Shappell
- Categorization of human error in complex systems
  - Latent Errors
  - Active Errors
- Philosophy of mishap analysis that focuses on the system instead of the individual
  - Original version used extensively by USN as post-hoc analysis tool
- AF HFACS will be foundation of new Aviation Safety Automated System (AvSAS) HF module


ORGANIZATIONAL INFLUENCES
Resource/Acquisition Management
Organizational Climate
Organizational Process
SUPERVISION
Inadequate Supervision
Planned Inappropriate Operations
Failure to Correct Known Problem
Supervisory Violations
PRECONDITIONS
Environmental Factors
Condition of Individuals
Personnel Factors
Physical Environment
Technological Environment
Physical/Mental Limitations
Cognitive Factors
Adverse Physiol States
Psycho-Behavioral Factors
Perceptual Factors
Crew Resource Mangement
Self Imposed Stress
ACTS
Errors
Violations
Skill-Based Errors
Judgement & Decision-Making Errors
Misperception Errors

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New HF System v Old HF System

Old

- 370 “Nanocodes”
- Drill Down AvSAS Interface
- Expert-Oriented
- Flt Doc Managed

New

- HFACS w/ 130 “Nanocodes”
- Search-Based AvSAS Interface
- User-Oriented
- Safety FSO/NCO Managed w/ HF Consultation

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Class A Comparison Rate Producing FY 01 thru FY 03

	'03	'02	'01
Total Class A	31	35	24
Total Destroyed	22	19	21
Total Fatalities	10	22	9
Total Cost	$ 485,621,080	$828,128,109	$384,276,382
HF Class A	21	29	15
HF Destroyed	15	16	12
HF Fatalities	10	21	9
HF Cost	$ 363,024,959	$ 784,267,009	$271,743,382

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Some Good News in FY03

- **4 less Class A flight mishaps (31 vs. 35)**
  - **Class A mishap rate (1.30 vs. 1.48)**
  - **131,000+ *Less* Total Flight Hours in FY03**
- **16% Decrease in ops mishaps**
  - **55% (17 of 31) vs 71% (25 / 35)**
- **Helo mishaps cut in half**
  - **4 Class A mishaps in FY03 … rate 7.41**
- **11 less total fatalities (11 vs. 22)**

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Some (Not So) Good News in FY03

COMPARED TO FY 02:

- **Number of Destroyed Aircraft Increased**
  - **22 vs 19**
- **Higher Class A Fighter/Attack Mishap Rate**
  - **2.47 vs 2.16**
- **F-16s**
  - **11 Class As (7 in FY02)**
  - **Rate: 3.22 (1.90 in FY02, the best ever)**
  - **4 Viper Mishaps in last month of fiscal year!**
    - **3 of these were Ops-Related**

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Lessons Re-learned

- 5 Mid-Air Collision Mishaps
  - Judgment, Misplaced Priorities
- High Correlation of Fatalities to Op
  - All 10 AF Fatalities in Ops Mishap
    - 2 Midairs (A-10, F-16)
    - 2 CFITs (F-16, HH-60G)
    - Runway Departure (T-38)
- Helicopter Mishaps
  - 3% of Total hours, 60% of Total Fatalities

Leadership Must Weigh Mission Risk vs. Benef

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FY03 HF Summary

- **HF responsible for all 10 fatalities**
- **HF major/causal for 68% of rate producing Class A's**
- **HF mishaps cost over $363 Billion**
- **Channelized attention most common HF x 3yrs**

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Questions?

39 Seconds - From Brake Release to Aircraft Impact

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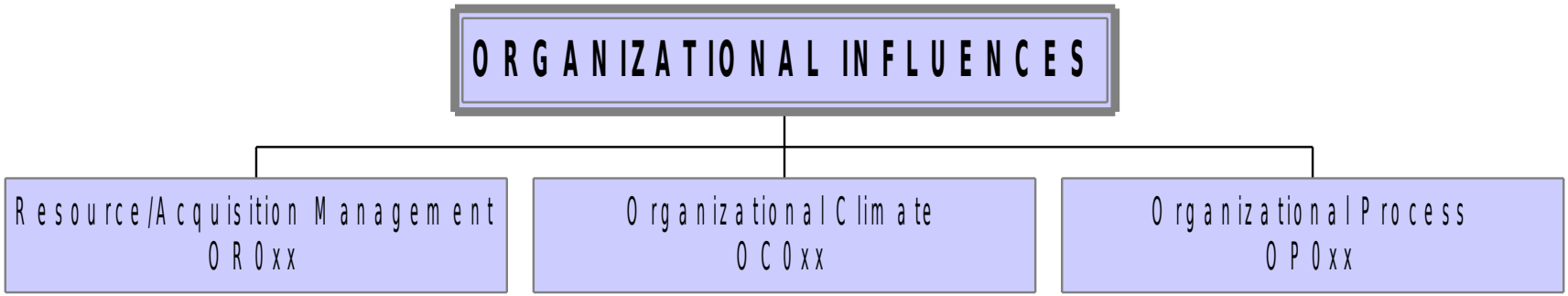
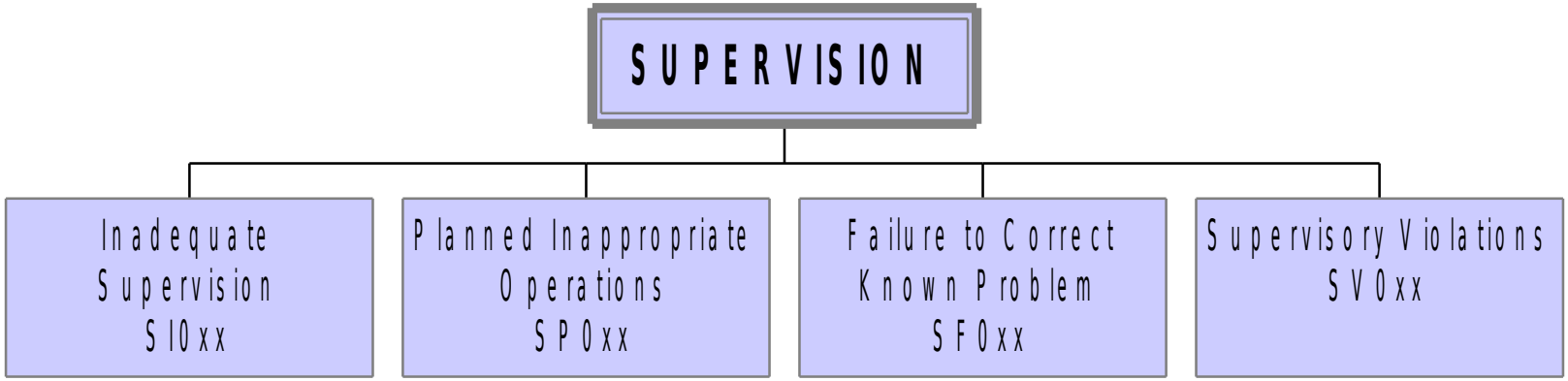
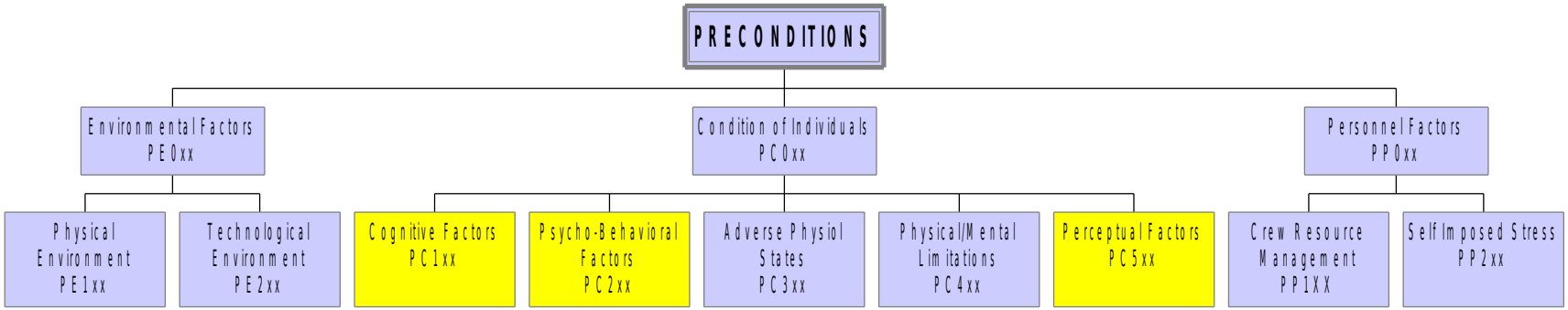
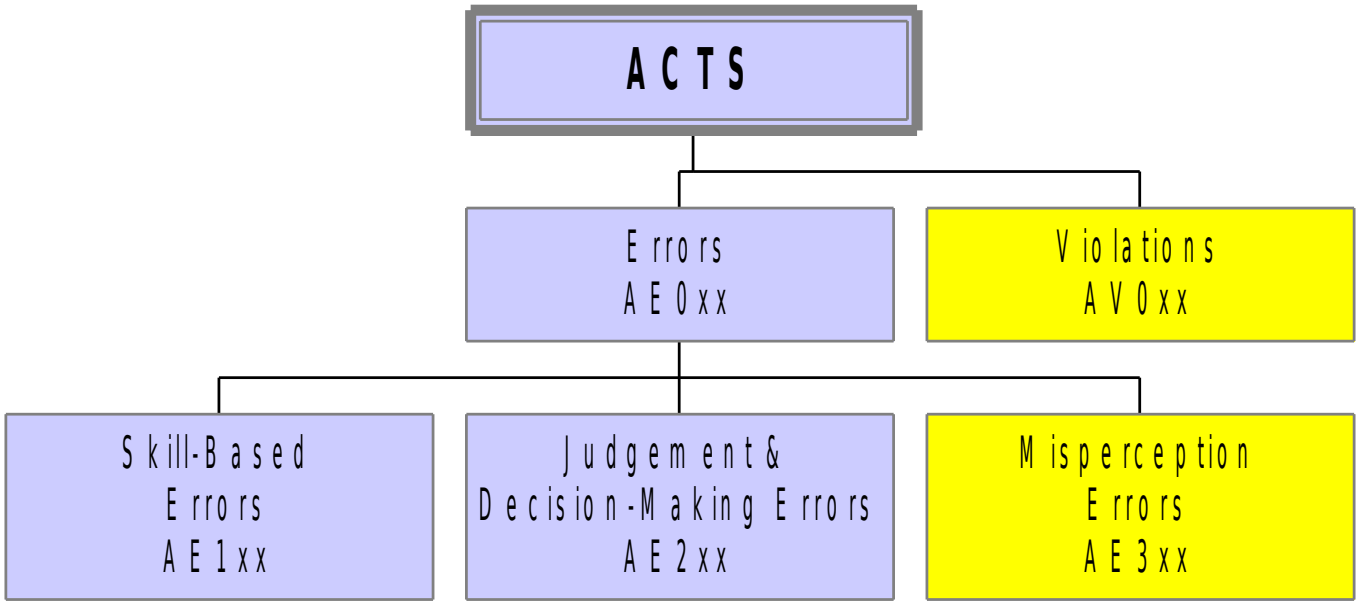
Back-Up Slides


ORGANIZATIONAL INFLUENCES
Resource/Acquisition Management
ORGxx
Organizational Climate
OCGxx
Organizational Process
OPGxx


SUPERVISION
Inadequate Supervision SI0xx
Planned Inappropriate Operations SP0xx
Failure to Correct Known Problem SF0xx
Supervisory Violations SV0xx


PRECONDITIONS
Environmental Factors PE0xx
Condition of Individuals PC0xx
Personnel Factors PP0xx
Physical Environment PE1xx
Technological Environment PE2xx
Cognitive Factors PC1xx
Psycho-Behavioral Factors PC2xx
Adverse Physiol States PC3xx
Physical/Mental Limitations PC4xx
Perceptual Factors PC5xx
Crew Resource Management PP1XX
Self Imposed Stress PP2xx


ACTS
Errors
AE0xx
Violations
AV0xx
Skill-Based
Errors
AE1xx
Judgement &
Decision-Making Errors
AE2xx
Misperception
Errors
AE3xx

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FY 03 UAV Mishap Summary

- 6 YR Avg 4.17
- 4 UAVs Destroyed in FY
- 55% *Decrease* Compare to FY02 (10)

Aviation UAV Class A Mishaps

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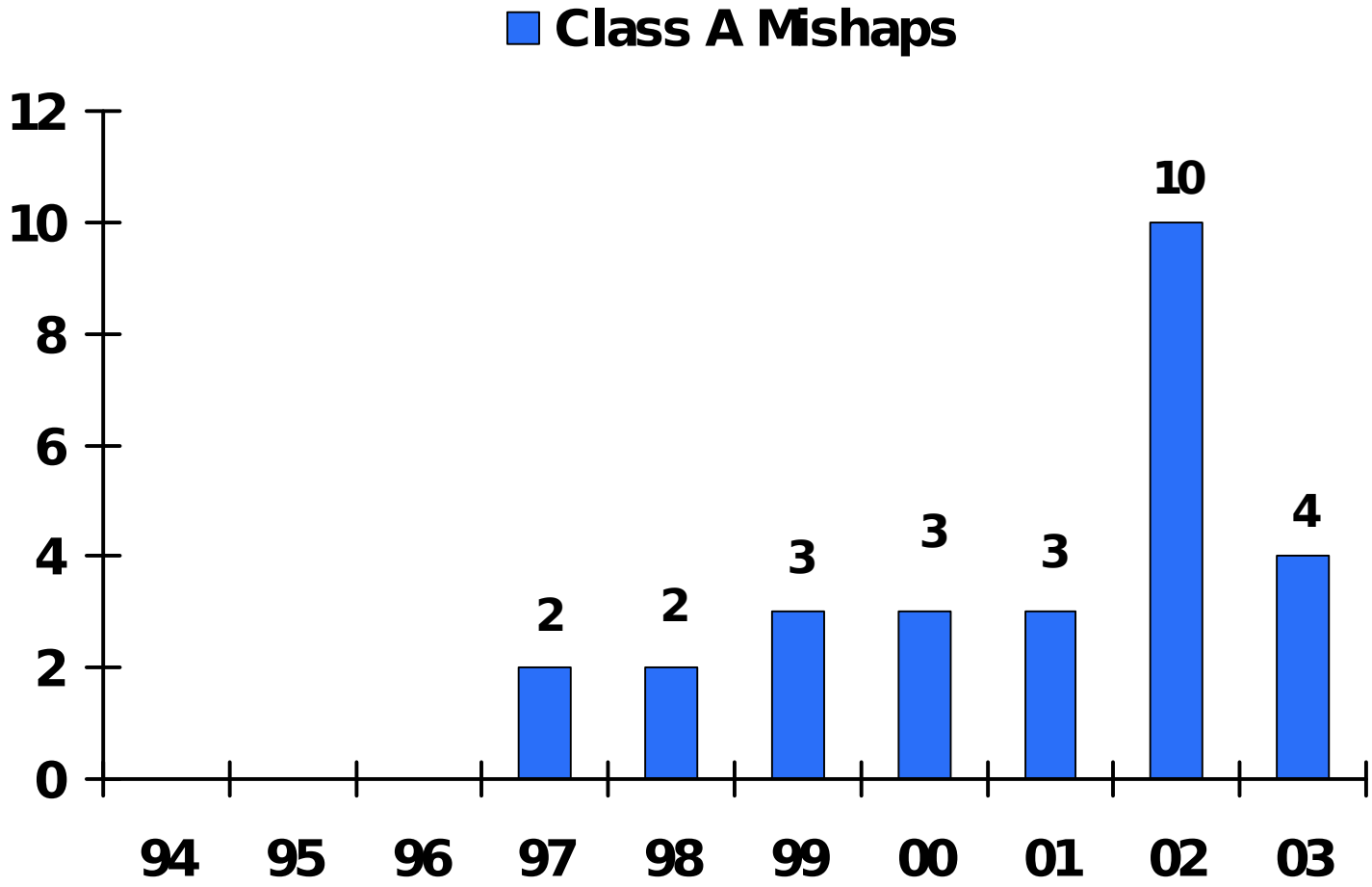

10-Year Average Annual Flight Class A Mishaps: 2.7